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Datasheet for the decision of 15 October 2025

Case Number:	T 1111/23 - 3.3.03
Application Number:	15719487.9
Publication Number:	3140328
IPC:	C08F110/06, C08F210/06, C08F4/657
Language of the proceedings:	EN

Title of invention:

RANDOM PROPYLENE-ETHYLENE COPOLYMERS AND PROCESS FOR THEIR PREPARATION

Patent Proprietor:

Basell Poliolefine Italia S.r.l.

Opponents:

Borealis GmbH
W.R. Grace & Co.-Conn.

Relevant legal provisions:

RPBA 2020 Art. 12(4), 12(6), 13(2)
EPC Art. 54, 56

Keyword:

Late-filed evidence - circumstances of appeal case justify admittance (yes)
Amendment after summons - exceptional circumstances (no)
Late-filed objection - no longer maintained in first-instance proceedings (no)
Novelty - (yes)
Inventive step - (yes)

Decisions cited:

T 1323/17

Beschwerdekammern

Boards of Appeal

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Case Number: T 1111/23 - 3.3.03

DECISION
of Technical Board of Appeal 3.3.03
of 15 October 2025

Appellant 1: (Opponent 1)

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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted on 26 April 2023 concerning maintenance of the European Patent No. 3140328 in amended form.**

Composition of the Board:

Chairman	D. Marquis
Members:	O. Dury
	L. Basterreix

Summary of Facts and Submissions

I. The appeals of opponents 1 and 2 lie from the interlocutory decision of the opposition division concerning maintenance of European patent N° 3 140 328 in amended form according to the claims of auxiliary request I, which was filed with letter of 16 January 2023, and an adapted description.

II. The following documents were *inter alia* cited in the decision under appeal:

D1: WO 2006/120190 A1
D3: EP 2 281 851 A1
D6: M. Gahleitner et al., J. Appl. Pol. Sci., Vol. 95, 2005, pages 1073-1081
D9: WO 2004/033509 A1
D10: US 6 365 685 B1
D14: US 6 057 413
D15: Handbook of Polypropylene and Polypropylene Composites, Second Edition, Revised and Expanded, 2003, Chapter 2, first nine pages
D29: Experimental report, J. Reeds, 9 January 2023
D40: Declaration of M. Gahleitner, 11 January 2023
D41: Declaration of C. Tranninger, 12 January 2023

III. This decision was based on a main request and on auxiliary request I, both filed with letter of 16 January 2023. As far as relevant to the present case, the following conclusions were reached in this decision:

- The subject-matter of claim 1 of the main request was novel over, among others, D1, D3 and D9 but was anticipated by the disclosure of D10.

- Regarding novelty of auxiliary request I, it was indicated that no arguments had been raised by the opponents and novelty over D10 was acknowledged in view of the amendments made (reasons: points 42-43).

- The subject-matter of claim 1 of auxiliary request I involved an inventive step when any of documents D1, D9, D10 or D14 was taken as the closest prior art.

For these reasons, the patent as amended on the basis of the claims of auxiliary request I was held to meet the requirements of the EPC.

IV. Opponent 1 (appellant 1) filed an appeal against the above decision and, together with their statement of grounds of appeal, filed the following document:

D42: ISO 16152, First edition, "Plastics - Determination of xylene-soluble matter in polypropylene", 1 July 2005

V. Opponent 2 (appellant 2) filed an appeal against the above decision and, together with their statement of grounds of appeal, filed the following document:

D43: Experimental report, J. Reeds, 13 August 2023

VI. With the rejoinder to the statements of grounds of appeal, the patent proprietor (respondent) requested the dismissal of the appeals as main request and filed three sets of claims as auxiliary requests I to III.

VII. The parties were summoned to oral proceedings to take place on 15 October 2025 (and if necessary 16 October 2025), whereby the parties were informed that appeal case T 1002/22 would also be dealt with on that occasion. With letter of 11 April 2025, a communication pursuant to Article 15(1) RPBA was then issued by the Board.

VIII. During the oral proceedings that were held in the presence of all parties, appellant 2 filed the following document and requested it to be admitted into the proceedings:

D44: ISO 16152, Second edition 2022-06, "Plastics — Determination of xylene-soluble matter in polypropylene"

IX. **The final requests of the parties were as follows:**

(a) Appellants 1 and 2 both requested that the decision of the opposition division be set aside and the patent be revoked.

(b) The respondent requested that the appeals be dismissed (main request) or, in the alternative, that the patent be maintained in amended form on the basis of any of auxiliary requests I to III filed with their rejoinder to the statements of grounds of appeal.

X. Claim 1 of the **main request**, which is the sole claim relevant to the present decision, read as follows:

"1. Propylene-ethylene copolymers characterized by the following features:

- ethylene content of between 0.1 and 5% by weight;

- molecular weight distribution (MWD), expressed in terms of Mw/Mn, greater than 3;

- Melt Flow Rate (MFR 230°C 2,16kg) referred to the copolymers as a reactor grade ranges from 0.2 to 45 g/10';

- absence of 2,1 propylene insertions;

- content of xylene soluble fraction (XS) and ethylene content (C2) such that the point defined by said values falls below the line given by the equation:

$$XS = 0.969 \cdot e^{0.435C2}$$

where:

XS = % by weight of the fraction soluble in xylene at 25°C measured according to ISO 16152, 2005, but with the deviations set forth in the description;

C2 = % by weight of ethylene units in the copolymer determined via NMR."

XI. The parties' arguments, in so far as they are pertinent, may be derived from the reasons for the decision below. The points of dispute were essentially the following ones:

(a) The admittance into the proceedings of documents D43 and D44.

(b) The non-admittance of the novelty objections in view of documents D3 and D9 that had been put forward by the appellants in theirs statement of grounds of appeal;

(c) The issue of novelty of the subject-matter of claim 1 of the main request in view of the disclosure of comparative example 3 of D3 and of example 10 of D9.

(d) The question if the subject-matter of claim 1 of the main request involved an inventive step when either D1, D14 or D9 was taken as the document constituting the closest prior art.

Reasons for the Decision

Main request (auxiliary request I allowed by the opposition division)

1. The operative main request is auxiliary request I that was allowed by the opposition division.

2. Admittance of D42

Together with their statement of grounds of appeal appellant 1 filed document D42. The respondent explicitly stated that they had no objection regarding the admittance of D42 (rejoinder: page 1, point 1, second paragraph; letter of 16 July 2025: page 1, end of point 1). The Board further notes that D42 is the standard method of determination of the feature on which the modified method mentioned in claim 1 of the main request is based (see wording of claim 1 "but with the deviations set forth in the description", which makes reference to points i-iii of paragraph 45 of the patent specification). In addition, the impact of these modifications on the determination of the XS feature was central to one of the main points of dispute between the parties during the opposition proceedings, namely whether the XS values disclosed in some prior art documents were according to claim 1 of the main request, which issue was still an object of dispute between the parties during the appeal proceedings. On that basis, the Board saw no reason to disregard D42 and made use of its discretion to decide to admit D42 into the proceedings (Article 12(4) RPBA).

3. Admittance of document D43

3.1 The respondent requested that D43 be not admitted into the proceedings (rejoinder: page 1, section 1, first paragraph).

3.2 Considering that D43 was submitted with the statement of grounds of appeal of appellant 2, the filing of this document and of the submissions based thereon with the statement of grounds of appeal constitutes an amendment to the case of opponent 2 (Article 12(2) and (4) RPBA), the admittance of which undergoes the stipulations of Article 12(4) to (6) RPBA.

3.3 According to appellant 2, the experimental report D43 was carried out to address incorrect findings of the opposition division regarding the effect of stirring or the impact of a nucleating agent on the determination of the XS feature (appellant 2's statement of grounds of appeal: point 3.4). It is further derivable from the statement of grounds of appeal of appellant 2 (points 6.16 to 6.18 and points 6.28 to 6.33) that D43 was filed in support of their objections of lack of novelty over each of D3 and D9, as well as lack of inventive step over D14.

3.3.1 Independently whether or not it were to be agreed with the respondent that D43 could have been filed during the opposition proceedings in view of the considerations indicated in the preliminary opinion of the opposition division in respect of novelty over D3 (rejoinder: page 2, two first full paragraphs), it is derivable from the file history that although the issue of novelty over D9 was at stake from the outset of the opposition proceedings, the patent proprietor raised for the first time at a relatively late stage of the opposition proceedings the (counter)argument that the values of XS content specified in D9 could not be fairly compared with the requirements mentioned in the operative claims because the method of determination of XS used in D9 differed from the one used in the patent in suit, in particular in respect of the use or not of stirring during the precipitation step and of the presence or not of a nucleating agent in the polymer composition (for stirring: see point 3.2.5 of the minutes of the oral proceedings; for the nucleating agent: see last written submission dated 16 January 2023, page 5). In this regard, while it is agreed with the respondent (letter of 12 November 2024: paragraph bridging pages 1 and 2) that some concerns regarding the method of determination of XS content performed in D3 were already raised by the opposition division in their preliminary opinion (point 28), the issue of the conditions of measurement of XS content in D9 was not addressed in this preliminary opinion (see point 34). Actually, the opposition division indicated in their opinion that they intended to acknowledge novelty over D9 because they had reasonable doubts that the relevant disclosure of D9 met the requirement of claim 1 regarding the absence of 2,1-propylene insertions. The opposition division further informed the parties that some concerns regarding the determination method of ethylene content according to D9 would also have to be discussed at the oral proceedings but did not mention any concerns regarding the determination method of XS content according to D9. Therefore, the Board considers that appellant 2 was confronted with the patent proprietor's arguments regarding the differences between the methods of determination of XS content used in D9 and in the patent in suit regarding both stirring and the presence of a nucleating agent for the first time during the oral proceedings (see point 3.2.5, second paragraph, of the minutes), whereby it further turned out that this issue was decisive for the decision of the opposition division to acknowledge novelty over D9 (see section 33 of the reasons). Therefore, the filing of D43 at the outset of the appeal proceedings, in as far as it is related to the comparison of the determination methods used in D42 (unmodified ISO standard), the patent in suit (modified ISO standard) and D9 (different method than said ISO standard) regarding the use or not of stirring (Table 1, in part) or to the possible impact of the presence of a nucleating agent in the polyolefin (Table 2) on the determination of the XS content constitutes a timely and legitimate reaction of appellant 2 in view of both a - late - development of the case and the reasons that led to the decision under appeal.

3.3.2 It was further taken into account that document D43 (Table 1 related to the patent in suit, D9 and D42; Table 2) was filed to support objections already at stake during the whole opposition proceedings, whereby appellant 2 relied on D43 to pursue in appeal the same lines of attacks as the ones put forward during the opposition proceedings (no "fresh case").

3.3.3 It is however noted that Table 1 of D43 contains experiments carried out with the method of determination of the XS content according to D1. In the Board's view, although the circumstances of the present case may justify the filing of data related to the methods of D42, the patent in suit and D9 for the reasons indicated in the preceding paragraphs, there are no compelling reasons why Table 1 of D43 also encompasses experimental data related to the method of determination of XS content according to D1. In particular, it is unclear how these data may be related to the issues of stirring and impact of a nucleating agent mentioned by appellant 2 to justify the filing of D43. In addition, the data of D43 related to D1 were not even relied upon by appellant 2 in their statement of grounds of appeal.

3.3.4 Although appellant 2 requested at the oral proceedings before the Board that the data of D43 related to D1 be admitted into the proceedings, it turned out that appellant 2 never made reference to these data during the oral proceedings. Therefore, there was eventually no reason for the Board to take a final decision on the admittance of the data of D43 related to D1.

3.3.5 In view of the above, the circumstances of the present case justified that the Board made use of its discretion to admit into the proceedings the information contained in D43, apart from the one related to D1 (Table 1, penultimate column) (Article 12(4) and (6) RPBA).

4. Admittance of document D44

4.1 During the oral proceedings before the Board, appellant 2 filed document D44 and requested that it be admitted into the proceedings, which was contested by the respondent (minutes: page 2, fourth paragraph).

4.2 Considering that D44 was filed after the Board's communication had been issued, its admittance is governed by Article 13(2) RPBA, according to which such an amendment to a party's appeal case is, in principle, not taken into account unless there are exceptional circumstances, which have been justified with cogent reasons by the party concerned, justifying the admittance of the amendment into the appeal proceedings.

4.3 Appellant 2 put forward that they intended to rely on D44 in order to show that the values of XS determined in D43 for various copolymers using the determination methods of either the patent in suit, D42 or D9 were all within the experimental margin of error of the methods and, therefore, did not differ one from each other. According to appellant 2, the filing of D44 was justified as a reaction to the Board's communication in which it was noted that in D43 the values of XS content obtained with the method of D42 were sometimes higher and sometimes lower than the ones obtained with the method of the patent in suit, whereby the differences in XS values obtained with the various methods were held to be significant.

4.4 However, appellant 2 has neither shown, nor even argued that the issue of the relevance of the differences in XS values reported in D43 for different determination methods had been raised for the first time by the Board in its communication. In that regard, the Board further considers that this is not the case since this issue was already addressed by the respondent in their rejoinder (page 4, lines 12-16). Therefore, the filing of D44 cannot be held to be a reaction to a new issue raised for the first time in the Board's communication.

4.5 In addition, appellant 2 did not justify why document D44 was relied upon for the first time during the oral proceedings before the Board and had not been submitted in writing in good time in advance of the oral proceedings before the Board. In this respect, since the Board's communication was sent to the parties well ahead of the oral proceedings (11 April 2025 vs. 15 October 2025), the Board sees no compelling reasons that would have prevented appellant 2 to do so. To the contrary, the indication at the top of D44 that the document was downloaded by appellant 2 on 13 August 2023 shows that D44 - and the arguments based thereon - could have been filed well in advance of the oral proceedings. By submitting D44 only on the day of the oral proceedings, very little time was given to the Board and the respondent to consider the content of this document and its possible relevance for the case, which is not appropriate.

4.6 In view of the above, the Board could not recognise any exceptional circumstances justifying such a late submission of D44 and decided not to take this document into account pursuant to Article 13(2) RPBA.

5. Admittance of the novelty objections in view of D3 and D9

5.1 Considering that the operative main request is auxiliary request I that was allowed by the opposition division, the respondent requested that the novelty objections in view of D3 and D9 that had been put forward by the appellants in their statement of grounds of appeal be not admitted into the proceedings because no novelty objections had been raised during the opposition proceedings against the then pending auxiliary request I (rejoinder: bottom of page 2 to top of page 3).

5.2 However, the Board agrees with appellant 2 that auxiliary request I defended by the patent proprietor during the oral proceedings before the opposition division and allowed by the opposition division is identical to auxiliary request II filed on 29 December 2021 (patent proprietor's letter erroneously dated 29 January 2021), against which novelty objections in view of D3 and D9 had been raised by the opponents (letter of appellant 2 dated 1 October 2024: page 3, second to fourth paragraphs; see also letters of 16 January 2023 of both opponents). Furthermore, there is no trace in the file that these novelty objections were withdrawn at any stage of the opposition proceedings.

5.3 In addition, it is derivable from the minutes of the oral proceedings before the opposition division that the novelty objections in view of D3 and D9 that had been raised by the appellants against the then operative main request did not succeed. Therefore, as pointed out by appellant 2 (letter of 1 October 2024: page 3, third paragraph), the same conclusions regarding novelty over these documents were bound to be equally valid for the then pending auxiliary request I, which is the present main request. In these circumstances, the statement made in the minutes of the oral proceedings (point 4.2) that the opponents "raised no novelty objections against the subject-matter of AR1" is understood by the Board as meaning that the opponents had no additional objections as compared to the ones already put forward against the then valid main request.

5.4 These views were communicated to the parties in good time ahead of the oral proceedings before the Board (communication: point 6) and remained uncontested. Therefore, there is no reason for the Board to deviate from its preliminary considerations.

5.5 For these reasons, the Board decided to reject the respondent's request that the novelty objections in view of D3 and D9 not be admitted into the appeal proceedings.

6. Novelty

6.1 The appellants argued that the subject-matter of claim 1 of the main request was not novel over the disclosure of comparative example 3 of D3 (both appellants) and the one of example 10 of D9 (appellant 2).

6.2 Novelty over comparative example 3 of D3

6.2.1 Comparative example 3 of D3 is directed to a propylene-ethylene copolymer with an ethylene content (C2) of 2.0 wt.% and an xylene soluble fraction content (XS) of 2.2 wt.% (D3: Tables 2 and 4), whereby these features are determined according to the methods indicated in paragraphs 86 and 85 of D3, respectively. Although it was not contested that the point defined by these values of C2 and XS (C2 = 2.0 wt.%; XS = 2.2 wt.%) felt below the line given by the equation

$XS = 0.969 \cdot e^{0.435C2}$ (C2 = 2.0 wt.%; XS = 2.31 wt.%), the point of dispute between the parties was if the same would be mandatorily true when C2 and XS were determined according to the methods specified in claim 1 of the operative main request (C2 should be determined with NMR; XS should be determined according to a modified method based on D42, as indicated in paragraph 45 of the patent specification), which were different from the ones of D3.

Ethylene content (C2)

6.2.2 The respondent argued that D3 indicated that the ethylene content was determined with an IR method but failed to disclose any information regarding the specific determination method used. Although it was specified in D3 that the IR method employed therein was calibrated with NMR, the skilled person would expect differences between measurements made with different IR methods. In addition, for each specific method, differences would be expected when different calibration methods by NMR were used. Such differences in the results of the various possible methods was particularly important when assessing if the XS feature (i.e. XS below the line $0.969 \cdot e^{0.435C2}$) specified in claim 1 of the main request was met, so the respondent (rejoinder: section 2.1, first block).

a) Although it is agreed with the respondent that it is indicated in paragraphs 86-87 of D3 that the ethylene content of the copolymer prepared in comparative example 3 thereof was determined by IR calibrated with NMR and that it is reasonable to consider that different methods of determination of ethylene content in this manner may lead to different results for the reasons indicated by the respondent, the question to be answered is whether or not the value of an ethylene content of 2.0 wt.% disclosed in D3 for comparative example 3 (Tables 2 and 4) implicitly, but directly and unambiguously, corresponds to an ethylene content of between 0.1 and 5% by weight determined via NMR as defined in claim 1 of the main request. In this regard, in the absence of any evidence that the ethylene content of the copolymer prepared in comparative example 3 of D3 may correspond, when determined by NMR (in a technically sensible manner and using any suitable NMR technique, taking into account that claim 1 of the main request contains no limitation in this regard), to an ethylene content outside the range specified in claim 1 of the main request, the Board shares the view of the appellants that the requirement of an ethylene content determined by NMR of between 0.1 and 5% by weight is met by the copolymer prepared in comparative example 3 of D3, especially since the value disclosed in D3 (2.0 wt.%) is around the middle of the range defined in operative claim 1 and reasonably remote from its end points. In addition, it is taken into account that the ethylene content feature is very usual in the art and commonly used in the present technical field to characterise polyolefins. Therefore, the ethylene content value of 2.0 wt.% determined with IR calibrated with NMR disclosed in D3 for comparative example 3 is considered to constitute a characterising feature of the polymer prepared therein, i.e. the skilled person would have no reason to expect that such a value, when determined by NMR as specified in claim 1 of the main request, would be so different that it would be lower than 0.1 wt.% or higher than 5 wt.%.

c) The above conclusion is further in line with the fact that, as indicated in point 22.2, third paragraph, of the decision under appeal in respect of the assessment of novelty over D1, the values of ethylene content determined by NMR in the patent in suit for the polymers according to comparative examples 2 and 3 (Table 1) are identical to the ones determined by IR on the same polymers (D10: Table 1, examples 1 and 4; according to paragraph 64 of the patent in suit, comparative example 2 and 3 thereof are identical to examples 1 and 4 of D10). The fact that the determination methods of ethylene contents by IR and NMR lead to very similar results is also shown in Table II of D6 (see point 22.2 of the reasons, last paragraph together with the two tables at the top of page 8 of the statement of grounds of appeal of appellant 1).

d) In view of the above, the value of ethylene content of 2.0 wt% disclosed for comparative example 3 of D3 constitutes, despite possible inaccuracies related to the NMR calibration method used to determine this feature by IR in D3, a direct and unambiguous disclosure of an ethylene content of between 0.1 and 5% by weight determined via NMR according to claim 1 of the main request, i.e. the ethylene content is not a feature that distinguishes the subject-matter of claim 1 of the main request from the disclosure of comparative example 3 of D3.

XS content

6.2.3 Regarding the XS feature, the point of dispute in appeal was related to the conclusion reached by the opposition division, according to which novelty of operative claim 1 over comparative example 3 of D3 was acknowledged in view of the differences between the determination methods of XS in D3 and in the patent in suit. The opposition division in particular considered that in D3 the cooling time was longer (45 minutes altogether) and the sample was not stirred (reasons: point 28.2). On this basis, the opposition division considered that it could not be concluded that the requirement of claim 1 in terms of the XS feature (XS below the line $0.969 \cdot e^{0.435C2}$) was mandatorily met by the copolymer prepared in comparative example 3 of D3 when C2 and XS were determined according to the methods specified in claim 1 of the main request.

a) Regarding the ***duration of the cooling time***, it is indicated in paragraph 45 of the patent in suit that the method of determination of XS content used therein differs from the one according to standard ISO 16152, 2005 (D42) only in the three features i-iii indicated therein, whereby said paragraph 45 reads as follows:

"[0045] The Xylene Soluble fraction was measured according to ISO 16152, 2005, but with the following deviations (between brackets what prescribed by the ISO 16152)

i- The solution volume is 250 ml (200 ml)

ii- During the precipitation stage at 25°C for 30 min, the solution, for the final 10 minutes, is kept under agitation by a magnetic stirrer (30 min, without any stirring at all)

iii-The final drying step is done under vacuum at 70°C (100 °C)

The content of said xylene-soluble fraction is expressed as a percentage of the original 2.5 grams and then, by difference (complementary to 100), the X.I. %"

On that basis, the Board agrees with the appellants that the procedure of determination of XS content disclosed in paragraph 85 of D3 is substantially in line with the disclosure of points 5.3.8 to 5.3.10 of D42 (statement of grounds of appeal of appellant 1: points 1.5 to 1.12; statement of grounds of appeal of appellant 2: points 6.12 and 6.13). Further considering that the three features i-iii specified in paragraph 45 of the patent in suit that distinguish the method of the patent in suit from the one of D42 were not shown to be related to the disclosure of points 5.3.8 to 5.3.10 of D42, the Board is satisfied that the duration of the cooling time in the method of D3 is identical to the one of the method used in the patent in suit, contrary to the view of the opposition division. This view, which was communicated to the parties in the Board's communication (point 7.2.3.a) was not contested by the respondent, in particular in their letter of 16 July 2025 (point 3) or during the oral proceedings before the Board. In these circumstances, the Board sees no reason to deviate from its preliminary considerations.

b) Regarding the ***influence of stirring on the determination of XS content***, the respondent argued that it could be expected that "several parameters can affect the measurement and that the extent of difference in the results is also depending on the nature of the polymer sample" (rejoinder: bottom of page 3).

b1) In that regard, the Board shares the respondent's view that, considering the physical processes underlying the determination of the XS content - namely solubilisation followed by precipitation - it is to be expected that applying a different procedure for the precipitation step can have an impact on the result obtained.

b1.1) This consideration is further in line with the detailed instructions provided in D42 for the precipitation step (whereby the absence of stirring is explicitly mentioned in section 5.3.10) and the additional indication in the note between sections 5.3.10 and 5.3.11 of D42 that the rate of cooling affects the result. Furthermore, also the results of D41 and D43 (regarding the latter, as far as they were admitted) confirm this. It is for instance shown therein that the determination of XS content using either the method of the patent in suit or the one used in D42 can produce different results (D42 is ISO 16152, which is used in D41 and corresponds, according to appellant 2, to ASTM D5492-17, which is used in D43; it was further common ground that the method according to paragraph 85 of D3 is according to D42). In particular, it can be inferred from D41 and D43 that the results obtained with the method of D42 are sometimes higher, sometimes lower than the ones obtained with the method of the patent in suit (see Table 1 in each of D41 and D43). In addition, although the differences between both methods are sometimes rather small, this is not always the case. This is in particular not the case for the polymer that is the most similar to the polymer according to comparative example 3 of D3 in terms of intrinsic properties (MFR2.16 and C2: see first row of Table 1 of D43).

b1.2) An additional point of dispute between the parties was related to the possible ***impact of the nature of the polymer on the XS content***. Contrary to the respondent who considers that the extent of difference in the results was also depending on the nature of the polymer sample (rejoinder: bottom of page 3; letter of 22 January 2024: page 8, first full paragraph), appellant 2 considered that there was no reason to expect that features such as the type of Ziegler-Natta catalyst used or the MFR value would influence the determination of the XS content (letter of appellant 2 of 1 October 2024: page 4, third full paragraph).

That issue was already addressed in point 22.4 of the reasons of the decision under appeal, in which the opposition division considered that the skilled person would expect that the difference in the values of XS contents obtained with different methods of determination would differ for heterophasic copolymers as compared to random copolymers. In particular, the opposition division pointed out that in D41 the difference between the methods of D42 and the patent in suit led to higher differences in XS contents for random copolymers than for heterophasic copolymers.

In this regard, it is noted that on the one hand the appellants have provided no counterargument to refute the conclusion of the opposition division, which appears reasonable to the Board. On the other hand, apart from the concerns about heterophasic copolymers (as the ones used in D41 and referred to as HECO1 and HECO 2 in Table 1 of D41), the respondent has also not provided any evidence to support their view, nor have they provided any technical explanation as to why the XS content would depend on the nature of the polymer sample, when, for instance, different random copolymers are compared to each other (D41, Table 1 without the HECO polymers; D43, Table 1) or when random copolymers are compared to homopolymers (D43, Table 2).

The respondent pointed out that although samples 1 and 2 of D29 were directed to copolymers prepared in a similar manner and having identical ethylene content and slightly different MFR, they exhibited significantly different XS contents (D29: Table 1). Therefore, XS contents of polymers would not be comparable if different methods of determination were used for copolymers with different properties (e.g. level of MFR; see respondent's letter of 22 January 2024: page 8, first full paragraph).

However, considering that according to appellant 2, samples 1 and 2 of D29 are related to copolymers prepared using different catalyst systems (letter of 1 October 2024: page 6, penultimate paragraph on D14), the respondent's argument based on D29 did not convince. Although it is correct that it is not explicitly stated in D29 that different catalyst systems were used to prepare samples 1 and 2 (respondent's letter of 12 November 2024: page 3, penultimate paragraph), the Board is satisfied that the fact that the two copolymers prepared in D29 exhibit different MFR values is sufficient to show that the two copolymers are effectively different from each other. In addition, the argumentation of appellant 2 that the difference in XS contents of samples 1 and 2 of D29 was due to the different catalyst systems used to prepare these samples is in line with the statement made in column 8, lines 34-40 of D14 that the selection of polymerisation conditions is important since the XS content varies depending on the type of catalyst, catalyst composition and polymerisation conditions such as temperature.

For these reasons, the Board considers that at least the data on XS contents of D41 and D43 related to random copolymers that were determined with a given method can be compared with each other.

b1.3) Regarding the XS contents data of D41 (for random copolymers) and D43 (as far as they were admitted), the Board notes that the values of XS content obtained for a given polymer with the method of D42 (referred to as ISO 16152 in D41 and to ASTM D5492-17 in D43) are sometimes higher and sometimes lower than the ones obtained with the method of the patent in suit. In particular in the domain of XS of interest for comparative example 3 of D3 (2.2 wt% according to Table 2 of D3), it is shown in D43 that the different methods may lead to significant differences (see e.g. the first two rows of Table 1 of D43).

In these circumstances, the Board finds that, as already held by the opposition division in the decision under appeal, the correlations/extrapolations relied upon by appellant 2 on the basis of the data of D41 (figure 1) do not allow to conclude that the differences in the XS content when determined either according to D42 or to the modified version thereof according to the patent in suit were "very small and negligible" (D41: page 2, first sentence). In that respect, the Board shares the concerns of the opposition division regarding the validity of a regression curve based on polymers with substantially different structures (the regression line according to figure 1 of D41 was obtained from the data of both random and heterophasic copolymers) and agrees with their conclusion that such a correlation did not amount to a direct and unambiguous disclosure of the effective XS content of the copolymer prepared in comparative example 3 of D3 as determined using the method specified in claim 1 of the operative main request (decision under appeal: point 22.4 of the reasons).

The Board has similar concerns in respect of the XS data reported in Table 1 of D43: in view of the differences shown therein between the XS contents determined with the method of either D42 or the patent in suit, D43 does not constitute a direct and unambiguous disclosure of the XS content determined with the method of the patent in suit for the copolymer according to comparative example 3 of D3. In particular, it cannot be concluded that the XS content of the copolymer prepared in comparative example 3 of D3 would be 2.2 wt.% if it were to be determined according to the method specified in claim 1 of the main request. Therefore, the arguments of appellant 2 in this respect are rejected (see e.g. statement of grounds of appeal: points 6.16 to 6.18).

In this respect, the Board shares the view of the respondent and not that of appellant 2 (rejoinder: bottom of page 3 to top of page 4; letter of 1 October 2024: page 4, third paragraph; both in respect of novelty over D3) that considering the physical processes involved in the determination of the XS content, it cannot be excluded that the nature of the polymer, i.e. its internal structure, may have an impact on the determination of the XS content when different methods are used. For that reason, the Board adheres to the respondent's view that no conclusion regarding the value of XS content according to the patent in suit of the copolymer according to comparative example 3 of D3 may be derived from an XS value that was determined on a different polymer with a different determination method. On that basis, it cannot be concluded, even when taking the relevant data of D41 and D43 into account, that the copolymer according to comparative example 3 of D3 constitutes a direct and unambiguous disclosure of a copolymer that meets the requirements in terms of XS according to claim 1 of the main request.

b2) The Board further took into account that, for a copolymer with an ethylene content of 2.0 wt.% according to comparative example 3 of D3, the requirement that XS should be below the line $0.969.e^{0.435C2}$ specified in claim 1 of the main request is only met if C2 is at most 2.31 wt.%, which is close to the value of 2.2 wt.% reported in D3 (Tables 2 and 4). This means that, should the XS content of the polymer prepared in comparative example 3 of D3 be 2.31 wt.% when measured with the method according to the patent in suit instead of 2.2 wt.% with the method according to D3, then the requirement that XS should be below the line $0.969.e^{0.435C2}$ specified in claim 1 of the main request would not be met. In the Board's view, such a discrepancy between both methods of determination cannot be excluded in view of the data contained in Table 1 of D41 and Table 1 of D43 (as far as these data were admitted).

b3) In addition, the Board considers that the requirement that XS should be below the line $0.969.e^{0.435C2}$ specified in claim 1 of the main request cannot be held to be directly and unambiguously met by the polymer prepared in comparative example 3 of D3 in view of the combined uncertainty of the values of both the ethylene content (see point 6.2.2 above) and the XS content (see points 6.2.3.b1 and 6.2.3.b2 above).

6.2.4 In view of the above, it is concluded that the evidence on file does not allow to conclude that the copolymer prepared in comparative example 3 of D3 constitutes a direct and unambiguous disclosure of a copolymer that meets the requirement that XS should be below the line $0.969.e^{0.435C2}$ specified in claim 1 of the main request (i.e. with C2 and XS determined with the methods specified therein).

6.3 Novelty over example 10 of D9

6.3.1 Example 10 of D9 is directed to a propylene-ethylene copolymer with an ethylene content (C2) of 3.0 wt.% and an xylene soluble fraction content (XS) of 3.2 wt.% (D9: Tables 1 and 2). While D9 contains no information regarding the determination method used to determine C2, XS is determined according to the method described on page 11, lines 5-28 of D9. Although it was not contested that the point defined by the values of C2 and XS disclosed in D9 (C2 = 3.0 wt.%; XS = 3.2 wt.%) fell below the line given by the equation $XS = 0.969 \cdot e^{0.435C2}$ (C2 = 3.0 wt.%; XS = 3.6 wt.%), the point of dispute between the parties was, similarly to the assessment of novelty over comparative example 3 of D3, if the same would be mandatorily true when C2 and XS were determined according to the methods specified in claim 1 of the operative main request (whereby the determination method of XS is not identical to the one of D9).

Ethylene content (C2)

6.3.2 The respondent argued that, considering that D9 did not indicate at all how the ethylene contents (C2) reported therein were determined, the requirement in terms of ethylene content specified in claim 1 of the main request was not met (rejoinder: section 2.2, page 5, second full paragraph).

However, although it is correct that there is no indication in D9 how the ethylene contents are determined therein, the statement of appellant 2 that there were only two methods to determine ethylene content (NMR; FTIR calibrated against NMR; see statement of grounds of appeal: point 6.24) and that both methods gave very similar results was not contested by the respondent. In addition, even if the argument of the respondent that different NMR methods and calibration methods of FTIR against NMR were available in the art and may lead to different results appears credible (as already indicated in respect of novelty over D3), there is no evidence on file that these methods would lead to so different results that the value of ethylene content of 3.0 wt.% according to example 10 of D4 (Table 2, page 29) could be, when determined via NMR, outside the range of between 0.1 and 5% by weight according to claim 1 of the main request. In the absence of any evidence in support of the respondent's argument, there is no reason for the Board to deviate from the conclusion already reached by the opposition division according to which the value of 3.0 wt.% disclosed in D9 corresponded to a value determined via NMR within the range defined in claim 1 of the main request (reasons: point 33.3). However, the Board still finds that there are doubts about the accuracy of the ethylene content measurement of the copolymer prepared in Example 10 of D9 when using the method specified in claim 1 of the main request, as previously mentioned in regard to the novelty of D3 (see point 6.2.2.d above).

XS content

6.3.3 In the decision under appeal, the opposition division held that the subject-matter of claim 1 of the present main request was novel over the disclosure of the propylene ethylene copolymer prepared in example 10 of D9 because it could not be concluded that said copolymer of D9 mandatorily met the requirement in terms of XS content specified in claim 1 when C2 and XS were determined as indicated therein. This conclusion was reached considering that i) the method of determination of XS used in D9 was different from the one of the patent in suit and that ii) the XS content data of D9 had been determined in a composition of the copolymer comprising a nucleating agent and it could not be excluded that the latter had an impact on the determination of XS.

a) Regarding the ***influence of the determination method of the XS content***, it was common ground that the method disclosed on page 11, lines 4-28 of D9 is different from the one of the patent in suit, whereby the difference at least resides in the absence of stirring during the precipitation step in D9 (as compared to the method according to paragraph 45 of the patent in suit).

a1) In view of this difference alone and for the same reasons as the ones that led to the conclusion reached in section 6.2.3.b4 above, the Board is satisfied that the evidence on file do not allow to conclude that the XS requirement specified in claim 1 of the operative main request (XS below the line $0.969.e^{0.435C2}$) is mandatorily met by the polymer prepared in example 10 of D9, when the C2 and XS contents are determined with the methods specified in claim 1 of the main request.

a2) Appellant 2 put forward that it had been shown in D43 (Table 1, second row) that, for a propylene-ethylene copolymer with ethylene content and XS content similar to the one of the copolymer according to example 10 of D9, the XS content obtained using the method of the patent in suit was less than the value obtained using the method of D9. Therefore, the XS value of 3.2 wt% reported in D9 for example 10 would lead to a value less than 3.2 wt.% if it were to be determined by the method of the patent in suit, which meant that the requirement in terms of XS would be met, so appellant 2.

However, for the reasons already indicated in above sections 6.2.3.b.1.3 and 6.2.3.b.3 and further taking into account that the argument of appellant 2 is based on a single measurement and was not carried out on a copolymer prepared according to example 10 of D9, this argument cannot succeed already for these reasons. In addition, it is noted that although it is correct that the ethylene content and XS content of the copolymer relied upon by appellant 2 (D43: second row of Table 1) are similar to the ones of the copolymer according to example 10 of D9, these copolymers have at least significantly different melt flow rates (43.6 g/10 min in D43; 2.8 g/10 min according to Table 1 of D9) suggesting that the internal structure of these copolymers is most certainly different. As outlined above in respect of novelty over D3, the Board shares the view of the respondent and not that of appellant 2 that considering the physical processes involved in the determination of the XS content, it cannot be excluded that the internal structure may have an impact on the determination of the XS content. Taking into account this concern, it cannot be concluded, even when taking the data related to D9 contained in Table 1 of D43 into account, that the copolymer according to example 10 of D9 constitutes a direct and unambiguous disclosure of a copolymer that meets the requirements in terms of XS according to claim 1 of the main request. For these reasons, the argument of appellant 2 did not convince.

In that respect, it is noted that the Board indicated in point 7.3.3.a of its communication that the evidence on file did not allow one to conclude that the XS requirement specified in claim 1 of the operative main request (XS below the line $0.969.e^{0.435c2}$) was mandatorily met by the polymer prepared in example 10 of D9 when the XS content was determined using the method specified in claim 1 of the main request. Appellant 2 did not contest this further, either in writing or at the oral proceedings before the Board. Therefore, the Board has no reason to deviate from its preliminary considerations.

b) Regarding the impact of a ***nucleating agent***, the Board further considers that it can be inferred from Table 2 of D43 that the presence of a nucleating agent in a homopolypropylene leads to a slightly higher XS content, as argued by appellant 2 (statement of grounds of appeal: point 6.33).

b1) Although it is correct that the examples of Table 2 of D43 were conducted on homopolymers and not on copolymers, in particular not on copolymers according to example 10 of D9, the Board is of the opinion that the aim of D43 is to show the impact of a nucleating agent on the determination method of the XS content of a polymer composition. Also, the respondent has provided no evidence, let alone any argument, to refute the view of appellant 2 that there were no reasons to expect that a nucleating agent should have an effect different from the one shown in D43 when it was present in a copolymer according to example 10 of D9 instead of a homopolymer as used in D43 (letter of appellant 2 of 1 October 2024: page 5, first full paragraph). As an aside, it is noted that the results of D43 are in line with the indication in section 6.2 of D42 that additives, should they have solubilities similar to that of the xylene soluble matter, may lead to an increase of the value of the XS content. Therefore, the respondent's argument related to the different nature of the polymers used in D43 and in D9 (rejoinder: top of page 6, homo- *vs*. copolymers) did not convince.

b2) Regarding appellant 2's arguments in section 6.32 of their statement of grounds of appeal that the wording of claim 1 of the main request does not exclude the presence of a nucleating agent in the claimed propylene-ethylene copolymer, the Board disagrees with appellant 2's interpretation of claim 1 of the main request. Indeed, in view of the wording of claim 1 itself, the Board considers that the XS content specified therein is the one of the (neat) propylene-ethylene copolymer and not the one of a composition thereof. The fact that it is indicated in paragraph 38 of the patent specification that additives such as nucleating agents may be used together with said copolymers to prepare films does not appear to justify the view that the XS content indicated in operative claim 1 is the one of a composition of the copolymer with a nucleating agent. Additionally, the absence of a requirement to determine the XS value prior to the addition of a nucleating agent in the propylene-ethylene copolymer composition is not convincing, since claim 1 specifies that the XS content is that of the claimed copolymer.

b3) For these reasons, it is concurred with appellant 2 that the presence of a nucleating agent in a propylene ethylene copolymer according to D9 may be expected to possibly lead to an increase of the XS content as compared to the neat copolymer. This means that the effective XS content of the neat polymer prepared in example 10 of D9 could be slightly lower than the value of 3.2 wt.% reported in Table 1 of D9 that was determined on the nucleated polymer.

b4) However, the exact effect of the nucleating agent on the XS content disclosed in D9 cannot be assessed, i.e. the exact value of the XS content of the neat copolymer prepared in example 10 of D9 as determined with the method of D9 remains ultimately unknown.

c) In these circumstances, in the light of the combined uncertainties related to the values of ethylene content (due to the lack of information of the determination method used in D9) and xylene soluble fractions (due to the possible impact of the nucleating agent and of the different methods of determination used in D9 and in the patent in suit), it cannot be concluded that example 10 of D9 constitutes a direct and unambiguous disclosure of a copolymer that meets the requirements that the point defined by XS and C2 falls below the line given by the equation $0.969.e^{0.435C2}$ when XS and C2 are determined according to the methods specified in claim 1 of the main request.

6.4 In view of the above, the subject-matter of claim 1 of the main request is novel over the disclosures of both comparative example 3 of D3 and example 10 of D9.

7. Inventive step - General considerations

In the decision under appeal, the opposition division held that the subject-matter of the claims of the present main request involved an inventive step when any of documents D1, D9, D10 and D14 was taken as the closest prior art. While appellant 1 contested the decision of the opposition division regarding inventive step related to D1, appellant 2 disagreed with the findings of this decision related to D9 and D14. However, the conclusion reached by the opposition division taking D10 as the closest prior art was not disputed and is, therefore, not the object of the present appeal proceedings.

8. Inventive step - D1 as the closest prior art

8.1 Closest prior art

In agreement with the opposition division, it was common ground between the parties that example 4 of D1 is a suitable starting point for the assessment of inventive step. The Board has no reason to deviate from that view.

8.2 Distinguishing feature(s)

8.2.1 D1 is directed to a propylene-ethylene copolymer that satisfies the combination of features (ethylene content, Mw/Mn, Mw/Mz, absence of 2-1 regioinversion and melting temperature) according to claim 1 thereof and to a preparation process using a specific catalyst system according to claim 9 thereof. Such copolymers were prepared in examples 1 to 4 of D1, according to the process described on pages 17-18 and in Table 1 of D1, whereby some properties of these copolymers are reported in Table 1. In the decision under appeal (point 45.2 of the reasons), the opposition division held that the subject-matter of claim 1 of the present main request differed from the disclosure of example 4 of D1 in the following features:

- The requirement that the ethylene content (C2) should be between 0.1 and 5 wt.%.

- The requirement that the XS content determined according to the method of the opposed patent should be below the line $0.969.e^{0.435C2}$.

8.2.2 During the appeal proceedings before the Board, it was undisputed that the copolymer according to example 4 of D1 met the requirements of claim 1 of the main request in terms of molecular weight distribution (i.e. Mw/Mn), melt flow rate and absence of 2,1 propylene insertions. The Board has no reason to deviate from these views.

8.2.3 It was also common ground that the copolymer prepared in example 4 of D1 did not fulfil the requirement specified in claim 1 of the main request regarding the ethylene content (see e.g. points 2.4 to 2.6 of the statement of grounds of appeal of appellant 1). Considering that, according to Table 1 on pages 18-19 of D1, the ethylene content of the polymer prepared in example 4 of D1 is specified to be 6 wt.% as determined by IR spectroscopy (see bottom of page 12 of D1), the Board sees no reason to come to a different conclusion.

8.2.4 Regarding the XS content, it is indicated in Table 1 of D1 that the XS content of the polymer prepared in Example 4 of D1 is 12.4 wt.% when determined using the method described at the bottom of page 16 of D1. The Board agrees with the opposition division and the respondent (rejoinder, page 7, section 3.1, third sentence) that since the ethylene content of the copolymer prepared in example 4 of D1 is outside the range of 0.1 to 5 wt.%, as specified in claim 1 of the main request, the requirement of claim 1 that "the point defined by said values falls below the line given by the equation: $XS = 0.969\ e^{0.435C2}$" cannot be met, as the condition in claim 1 concerns "the point defined by said values," which is not met by the copolymer in example 4 of D1.

8.2.5 Appellant 1 argued that D40 and D41 showed that the difference in determining the XS content using slightly different methods yielded the same result. In particular there was practically no difference between the ISO standard and the method according to the opposed patent (statement of grounds of appeal: points 2.7 to 2.11). Therefore, the copolymer according to example 4 of D1 met the requirements in terms of XS content according to claim 1 of the main request, so appellant 1.

a) However, already in view of the above consideration (point 8.2.4), that argument cannot succeed.

b) In addition, the Board considers that D40 and D41 provide at most a comparison between the method of determination of XS content according to the patent in suit and the one according to D42 (which is the standard ISO 1652, 2005 that is specified in D41). However, considering that D1 does not make reference to D42 and that the method indicated at the bottom of page 16 of D1 was not shown to be according to D42, it cannot be held that any conclusion regarding the comparison of the determination methods used in the patent in suit and in D42 that would be reached on the basis of the information contained in D40 and/or D41 is mandatorily valid for the comparison of the method of determination of XS content according to the patent in suit with the one of D1. In particular, for the reasons outlined above (see point 6.2.3.b1.3), the Board considers that the correlation relied upon by appellant 1 on the basis of figure 1 of D41 is not persuasive (statement of grounds of appeal: point 2.8). This view, which was communicated to the parties well ahead of the oral proceedings before the Board (point 9.2.4 of the communication), remained uncontested, in particular during the oral proceedings before the Board.

8.2.6 In view of the above, the Board agrees with the conclusion reached by the opposition division that the subject-matter of claim 1 of the main request differs from the disclosure of example 4 of D1 in the two features indicated in point 8.2.1 above.

8.3 Problem effectively solved over the closest prior art

8.3.1 The parties disagreed how the problem effectively solved over the closest prior art was to be formulated.

a) During the oral proceedings before the Board, the respondent considered that the problem solved over example 4 of D1 resided in the provision of a propylene-ethylene copolymer with a broad processability window (difference between melting point and Seal Initiation Temperature (SIT) of at least 20°C) and good haze properties. The respondent further argued that since D1 did not disclose any information regarding the processability window (difference between melting point and SIT) and assessed haze in a different manner than in the patent specification and in the absence of any additional information in that respect on file, no direct comparison of these properties for a polymer according to claim 1 of the main request and the one according to example 4 of D1 could be made. In addition, the respondent considered that the comparison of example 8 with comparative example 4 of the patent in suit showed that the problem of providing a propylene-ethylene copolymer with a broad processability window and good haze was effectively solved for a polymer that met all features of claim 1 of the main request, which was not the case for a polymer that met all these features apart from the requirement in terms of XS.

b) According to appellant 1, the patent in suit did not demonstrate any effect related to the distinguishing feature related to the ethylene content. During the oral proceedings before the Board, appellant 1 further pointed out that the nature of the catalyst used in examples 7 and 8 of the patent in suit was not indicated. Therefore, contrary to the respondent's view, no fair comparison could be made between these examples and comparative example 4 of the patent specification. In addition, Tables 1 and 2 of D1 showed that example 4 of D1 exhibited both a low SIT as well as good haze. Therefore, according to appellant 1, the problem solved over D1 merely resided in the provision of an alternative propylene-ethylene copolymer (statement of grounds of appeal: points 2.12 and 2.13).

8.3.2 In the Board's view, considering that there is no data on file illustrating a direct comparison between a polymer according to claim 1 of the main request and the polymer according to example 4 of D1, the problem solved over D1 cannot be formulated in the form of an improvement, as eventually acknowledged by the respondent during the oral proceedings before the Board.

8.3.3 In addition, it is agreed with the opposition division (point 45.4 of the reasons) that no direct comparison can be made between the haze values reported in the patent in suit and in D1 since this property was assessed in these documents on films of different thicknesses (compare paragraph 60 of the patent in suit with the method of determination of haze on page 15 of D1). This is confirmed by the fact that the figures given for haze in Table 1 (between 32.8 and 41.1) and in Table 3 (0.14 to 0.30 %) of the patent in suit differ considerably from the values indicated in Table 1 of D1 (between 23.7 and 34 %).

8.3.4 Moreover, the same considerations are equally valid for the SIT values since the method of the patent in suit (paragraphs 57-58) is different from the one used in D1 (although there is no precise description in D1, it was at least determined on visbroken polymers, as is derivable from the description of examples 5 and comparison example 2 on page 19 in combination with page 4, last 8 lines, of D1 and not on the non-visbroken polymers as in the patent in suit). In these circumstances, the considerations of the parties in respect of SIT values disclosed in D1 and in the patent in suit cannot be taken into account (statement of grounds of appeal of appellant 1: point 2.12; rejoinder: section 3.1, penultimate paragraph).

8.3.5 Although there is no direct comparison between the subject matter of operative claim 1 and the closest prior art on file, the Board agrees with the respondent that it is possible to compare the results in terms of processing window and haze within a single document.

This can be done either within the patent in suit or within D1, since the same methods of determination were used in both cases. In this respect, the Board agrees with the respondent that Table 3 of the patent in suit shows that a polymer according to claim 1 (Example 8) has improved haze and a broader processing window (a difference of at least 20°C between the melting point (Tm) and the second inflection temperature (SIT)) than a similar polymer that does not meet the requirement for XS content (Comparative Example 4). The favourable properties obtained in Example 8 are also met by the copolymer in Example 7, although this copolymer is less comparable to the one in Comparative Example 4 (its characterizing features differ more).

In this regard, the Board took into account that it is known in the art that many of the properties of the copolymers according to claim 1 of the main request and assessed in Table 3 of the patent in suit are interrelated, so that modifying one of these properties may be expected to have an impact on other properties of the copolymer at stake. This makes it difficult to make a truly fair comparison between two polymers that differ only in the distinguishing features identified above. Nevertheless, the Board is satisfied that the comparison of the examples in Table 3 of the patent in suit, particularly example 8 and comparative example 4, is fair and shows that a copolymer according to claim 1 of the main request has improved haze properties and a broader processability window (greater than 20°C) than a similar polymer that does not meet the requirement in terms of XS content.

In addition, as was pointed out by the respondent during the oral proceedings before the Board, it is derivable from paragraphs 65 and 67 and Table 1 of the patent in suit that whereas the polymers of examples 7 and 8 of the patent in suit were prepared using a specific catalyst system containing a Bi component, this was not the case for the polymer according to comparative example 4. It is further derivable from Table 2 of the patent in suit that the process used to prepare the copolymers according to example 8 and comparative example 4 were very similar so that the differences in properties shown in Table 3 of the patent in suit can be attributed to the use of different catalysts. These results confirm the statement in paragraph 39 of the patent in suit that the favourable processing window and haze properties are due to the specific catalyst system used.

8.3.6 As regards the effect relied upon by the respondent, it is established case law that an unexpected effect demonstrated in a comparative test can be taken as an indication of inventive step on condition that the nature of the comparison with the closest state of the art is such that the alleged advantage or effect is convincingly shown to have its origin in the distinguishing feature or combination of distinguishing features of the invention as compared with the closest state of the art (Case Law of the Boards of Appeal of the EPO, 11th edition, 2025, I.D.4.3.2). It is also established case law that tests comparing the invention with the prior art have to be conducted in such a way that any effect can be attributed to the distinguishing feature. However, it is also permitted - and might even be necessary - to modify prior art embodiments in line with the invention to such a degree that the only remaining difference is the feature distinguishing the claim. Thus, comparative tests do not always have to be carried out using the closest prior art which means that intrinsic comparative tests can be used as evidence of an effect. What is ultimately of relevance is not only whether a causal link between a distinguishing feature over the closest prior art and an effect was demonstrated within the framework of a comparative test submitted by the patent proprietor, here the respondent. It also counts whether the variant of the closest prior art selected as a reference (or comparative) example for the comparative test is representative of the closest prior art, in the sense that the effect shown to be caused by the distinguishing feature in the context of the comparative test could also be expected to take place within the framework of the closest prior art despite the existence of differences vis-à-vis the reference example of the comparative test (Case Law, *supra*, I.D.4.3.2, see in particular the reference to T 1323/17).

In the present case, the Board considers that these requirements are met for the comparison of example 8 and comparative example 4 of the patent in suit. In particular, the appellants have provided no evidence or arguments to put in doubt that the effects shown in Table 3 of the patent in suit would not be achieved in the context of the disclosure of example 4 of D1.

8.3.7 In view of the above, the Board agrees with the formulation of the objective problem effectively solved over the closest prior art proposed by the respondent during the oral proceedings and considers that this problem resides in the provision of a propylene-ethylene copolymer with a processability window (Tm - SIT) of at least 20°C and with satisfying haze properties.

8.4 Obviousness

8.4.1 The question remains to be answered if the skilled person, desiring to solve the problem(s) identified as indicated above, would, in view of the closest prior art, possibly in combination with other prior art or with common general knowledge, have modified the disclosure of the closest prior art in such a way as to arrive at the claimed subject matter.

8.4.2 The argumentation of appellant 1 was based on the disclosure of D1 alone, considering that D1 taught ethylene content as low as 4.5 wt.% and hinted at reducing the XS content (middle of page 2).

a) However, as indicated above, D1 does not provide any teaching regarding how to provide a processability window (Tm - SIT, with SIT determined according to the patent in suit) of at least 20°C. Therefore, for that reason alone, D1 cannot render the subject-matter of claim 1 of the main request obvious.

b) In addition, as put forward by the respondent (rejoinder: point 3.1, last paragraph) and as discussed during the oral proceedings before the Board, it can be inferred from Table 1 of D1 that copolymers with an ethylene content within the range of claim 1 of the main request do not satisfy the requirements in terms of XS content specified in claim 1 of the main request (XS below $0.969 \cdot e^{0.435C2}$). No arguments were put forward by the appellants to explain which obvious measures could be taken by the skilled person in order to ensure that the XS requirements according to claim 1 of the main request be met when the ethylene content of the polymer prepared in example 4 of D1 was reduced so as to be within the range of said claim 1. Under these circumstances, the arguments of appellant 1 do not allow to conclude that, even if the skilled person were to decrease the ethylene content of the copolymer prepared in example 4 of D1, s/he would mandatorily arrive at the subject-matter of claim 1 of the main request, in particular a copolymer that meets the requirement in terms of XS content (determined according to the patent in suit).

c) In addition, although it is correct that D1 teaches that the ethylene content may be as low as 4.5 wt.% (D1: claim 1; Table 1), it is agreed with the respondent that Table 1 of D1 shows that reducing the ethylene content leads to a significant deterioration of haze properties. Therefore, it is further at least questionable whether the skilled person would be motivated to decrease the ethylene content of the copolymer prepared in example 4 of D1 to solve the posed problem (which includes the provision of good haze properties).

d) It is further noted that the passage in the middle of page 2 of D1 relied upon by appellant 1 to argue that "lowering of the XS content of inventive example 4 of D1 is prompted by a lower C2 content" (statement of grounds of appeal: point 2.14) is directed to copolymers of the prior art. Therefore, said passage is not relevant for copolymers according to D1 which are disclosed to provide an improvement of the prior art copolymers (see the following sentences of the same paragraph on page 2 of D1). In addition, appellant 1 did not explain which obvious measure(s) the skilled person would take in order to reduce the XS content of copolymers according to D1 while maintaining the other features of claim 1 of the main request in the required ranges. It was not even shown that it would be at all possible to meet the requirement in terms of XS content according to claim 1 of the main request when using the "specific catalyst component" taught in D1 (see page 2, fifth line from the bottom), in particular in the relevant examples according to Table 1 thereof.

8.4.3 Both during the written proceedings or the oral proceedings before the Board, appellant 2 did not put forward any additional arguments regarding inventive step starting from D1 as the closest prior art.

8.4.4 For these reasons, the arguments of the appellants do not justify that the Board overturns the decision of the opposition division that the subject-matter of claim 1 of the main request involves an inventive step when example 4 of D1 is taken as the closest prior art.

9. Inventive step - D14 as the closest prior art

9.1 Closest prior art

In agreement with the opposition division, it was common ground between the parties that example 1 of D14 is a suitable starting point for the assessment of inventive step. The Board has no reason to deviate from that view.

9.2 Distinguishing feature(s)

9.2.1 D14 (claim 1) is directed to the preparation of films having specific properties in terms of haze, heat sealing temperature and Young's modulus obtained from a propylene-ethylene copolymer prepared using a specific catalyst system according to claim 1 thereof. Such copolymers were prepared in examples 1 to 3 of D14 (see columns 11 to 13), whereby some properties of these copolymers (including ethylene content, xylene soluble fraction, melt flow rate) and of the films prepared therewith (haze, heat sealing temperature) are further reported in Table 1 of D14. In the decision under appeal (point 51.2 of the reasons), the opposition division held that the subject-matter of claim 1 of the present main request differed from the disclosure of example 1 of D14 in the following features:

- The requirement that the molecular weight distribution (MWD) expressed in terms of Mw/Mn should be greater than 3.

- The requirement that the XS content should be below the line $0.969.e^{0.435C2}$ when XS and C2 are determined according to the methods of the opposed patent.

9.2.2 During the appeal proceedings, it was undisputed that the copolymer according to example 1 of D14 met the requirements of claim 1 of the main request in terms of ethylene content, melt flow rate and absence of 2,1 propylene insertions. The Board has no reason to deviate from these views.

9.2.3 It was also common ground that D14 contained no information regarding the molecular weight distribution Mw/Mn feature specified in claim 1 of the main request. In addition, the opposition division's view that the mere disclosure of a Ziegler-Natta catalyst was not sufficient to consider that the copolymer prepared in example 1 of D14 mandatorily had a molecular weight distribution Mw/Mn greater than 3 was not contested. Eventually, appellant 2 even acknowledged that the requirement specified in claim 1 of the main request regarding the MWD distinguished the subject-matter being claimed from the disclosure of example 1 of D14 (see point 7.23 of the statement of grounds of appeal of appellant 2). The Board has no reason be of a different opinion.

9.2.4 Regarding the requirement of claim 1 of the main request that the XS content should be below the line $0.969.e^{0.435C2}$ when XS and C2 are determined according to the methods of the patent in suit, it is indicated in Table 1 of D14 that the ethylene content (C2) and the XS content of the polymer prepared in example 1 of D14 are 4.3 wt.% and 4.1 wt.% , respectively, whereby these parameters were determined using the methods specified in column 9, lines 37-41 (C2) and column 9, lines 45-52 (XS) of D14. Although it was undisputed that these values of ethylene content and XS content (C2 = 4.3 wt.%; XS = 4.1 wt.%) met the requirement in terms of XS content according to claim 1 of the main request (C2 = 4.3 wt.%; XS = $0.969.e^{(0.435(C2=4.3))}$ = 6.29 wt.%), the opposition division held that it had not been shown that said requirement was mandatorily met when the XS content was determined with the method specified in claim 1 of the main request (point 51.2.1 of the reasons). According to the opposition division, D29 did not convincingly show that the results of D14 would only slightly differ from the ones obtained using the method of the patent in suit because D29 did not study the impact of the features distinguishing the method of D14 from the one of the patent in suit, namely stirring and different temperatures for the solubilisation step.

a) The conclusion reached by the opposition division regarding the XS feature of claim 1 of the main request was contested by appellant 2 in appeal. According to appellant 2, both D29 and D43 showed that the copolymer according to example 1 of D14 met the requirements in terms of XS content according to claim 1 of the main request.

b) However, it is derivable from the determination method of XS disclosed in D14 (column 9, lines 45-52) that this method differs from the method of the patent in suit in terms of the temperature and duration of the precipitation steps (D9: 20°C, 4 hours; patent in suit: 25°C, 30 minutes) as well as stirring conditions (no stirring mentioned in D9; paragraph 45 of the patent in suit: agitation with a magnetic stirrer for the final 10 minutes). In the light of these differences, the Board considers that the same conclusion as the one reached in above section 6.2.3.b is bound to be reached, namely it cannot be concluded that the disclosure of example 1 of D14 constitutes a direct and unambiguous disclosure of a copolymer that meets the requirement that XS should be below the line $0.969.e^{0.435C2}$ specified in claim 1 of the main request when XS and C2 are determined according to the methods specified in claim 1 of the main request.

c) During the oral proceedings before the Board, appellant 2 pointed out that for an ethylene content of 4.3 wt.% according to example 1 of D14, the value of $XS = 0.969.e^{0.435C2}$ was 6.3 wt.%, which was much higher than the XS value of 4.1 wt.% as determined using the method of D14. According to appellant 2, the difference in terms of XS contents obtained using either the determination methods of D14 or the one of the patent in suit were much smaller: therefore, this requirement was bound to be met by the copolymer of example 1 of D14, so appellant 2.

However, the use or not of stirring is not the sole difference between the methods of determination used in D14 and the one of the patent in suit. In particular, the conditions of the precipitation step are also different (both in terms of temperature as already noted by the opposition division but also in terms of duration), which is explicitly indicated in D42 to be critical (see "Note" between sections 5.3.10 and 5.3.11 of D42). In addition, considering that the ethylene content is not determined by NMR in D14 (as required in claim 1 of the main request), there is - as already indicated above when assessing novelty over D3 - also some uncertainty in this respect, which may also have an impact on the XS value determined with the formula $XS = 0.969.e^{0.435C2}$ according to claim 1 of the main request. Based on the evidence on file, the Board believes that there are reasonable doubts as to whether the polymer prepared in example 1 of D14 meets the requirement that XS be below 0.969e0.435C2, as specified in claim 1 of the main request, when XS and C2 are determined according to the methods specified in claim 1 of the main request. In any case, the arguments put forward in appeal by appellant 2 provide no cause for the Board to overturn the decision of the opposition division in this respect, which, for the reasons indicated above, is held to be reasonable by the Board.

9.2.5 In view of the above, the Board agrees with the conclusion reached by the opposition division that the subject-matter of claim 1 of the main request differs from the disclosure of example 1 of D14 in the two features indicated in point 9.2.1 above.

9.3 Problem effectively solved over the closest prior art

9.3.1 Considering that:

- There is no direct comparison on file between a copolymer according to claim 1 of the main request and the one according to example 1 of D14;

- The determination methods of haze and SIT (seal initiation temperature) disclosed in D14 (see column 9: points (5) and (7)) are not identical to the ones of the patent in suit (paragraphs 57-60);

- D14 does not disclose any information regarding the melting temperature of the polymers prepared therein, let alone regarding a processability window defined as the difference between melting point and seal initiation temperature (Tm - SIT);

the problem solved over D14 cannot be formulated in terms of an improvement in terms of haze, SIT and/or processability window.

9.3.2 However, for the same reasons as indicated above in respect of the formulation of the problem effectively solved over D1 as the closest prior art, the Board considers that Table 3 of the patent in suit shows that a polymer according to claim 1 (examples 7 and 8) exhibits improved haze and a broader processability window (difference between melting point Tm and SIT of at least 20°C), than a similar polymer that does not satisfy the requirement in terms of XS content (comparative example 4).

9.3.3 On that basis, for the same reasons as the ones indicated above in respect of D1 as the closest prior art, the objective problem effectively solved over example 1 of D14 is held to reside in the provision of a propylene-ethylene copolymer with a processability window (Tm - SIT) of at least 20°C and with satisfying haze properties.

9.4 Obviousness

9.4.1 Regarding the obviousness of the solution, the arguments put forward in writing by appellant 2 were based on the disclosure of D14 alone or in combination with D15 (statement of grounds of appeal: points 7.28 to 7.30).

However, while appellant 2 explained in the written proceedings why they considered it obvious to modify example 1 of D14 so as to obtain a molecular weight distribution Mw/Mn in the range according to claim 1 of the main request, they have provided no arguments regarding why it would be obvious, in order to solve the problem posed, to modify example 1 of D14 so as to meet the XS feature. In particular, appellant 2 provided no argument regarding which obvious measures would be taken in order to do so, nor why it would be obvious to do such a modification in order to solve the problem posed. Under these circumstances, the arguments put forward in writing by appellant 2 do not show that the subject-matter of claim 1 of the main request is obvious when example 1 of D14 is taken as the closest prior art.

9.4.2 During the oral proceedings before the Board, appellant 2 stated that although it had not been discussed during the appeal proceedings yet, it had already been established during the opposition proceedings that the skilled person was well aware how to reduce the XS content, namely by increasing the amount of external donor in the catalyst system. Therefore, according to appellant 2, even if the XS content of the polymer of example 1 of D14 were to be held by the Board not to be in accordance with the requirement of claim 1 of the main request, the skilled person would have known how to arrive at a suitable XS content by applying a well known, routine procedure.

a) However, as pointed out by the respondent during the oral proceedings before the Board, there is no indication in D14 regarding the melting point of the copolymers prepared therein, let alone regarding the difference between melting point and heat sealing temperature (Tm - SIT). Also, it was neither shown, nor even argued that there were any additional information or evidence in this respect present on file. In these circumstances, the Board considers that the skilled person, when starting from example 1 of D14 as the closest prior art, cannot derive from D14 any teaching regarding how to achieve a processability window (Tm - SIT) of at least 20°C, which is part of the problem posed defined above. In addition, the Board agrees with the argument put forward by the respondent during the oral proceedings before the Board that it was not shown by appellant 2 that such a processability window (Tm - SIT) of at least 20°C could be achieved at all using a catalyst system according to the teaching of D14 and, if needed, common general knowledge.

b) In this respect, it is established case law that to determine whether the claimed invention is obvious starting from the closest prior art and the objective technical problem posed, it is not sufficient to show that the skilled person could have carried out the invention, but it has to be demonstrated that they would have done so in the expectation of solving the underlying technical problem (could/would approach, see Case Law, *supra*, I.D.5). In other words, it has to be demonstrated that the skilled person would have arrived at the subject-matter being claimed by modifying the prior art in the light of the technical problem posed.

In the present case, the Board considers that these requirements are not met since i) D14 itself contains no information regarding the melting point of the copolymer prepared in example 1 thereof and was not shown to address the part of the problem posed related to the provision of a processability window of at least 20°C and ii) it was also not shown that the skilled person would have done the required modification in order to solve this part of the problem because of promptings in other prior art documents.

In the Board's view, the argument of appellant 2 that the skilled person would know how to reduce the XS content of the copolymer prepared in example 1 of D14 addresses the question if the skilled person would know how to arrive at the subject-matter of claim 1 of the main request, which question only arises, in the Board's view, in knowledge of the solution provided by the patent in suit, which is not allowable (ex post analysis/hindsight). Indeed, it was not shown by appellant 2 that D14 (optionally in combination with D15 or any other prior art document) contains any motivation to do so, let alone to do so in order to solve the problem posed, in particular in respect of providing a processability window of at least 20°C.

c) For these reasons, the arguments of appellant 2 did not convince.

9.4.3 Both during the written proceedings and the oral proceedings before the Board, appellant 1 did not put forward any additional arguments regarding inventive step starting from D14 as the closest prior art.

9.4.4 In view of the above, the arguments of the appellants do not justify that the Board overturns the decision of the opposition division that the subject-matter of claim 1 of the main request involves an inventive step when example 1 of D14 is taken as the closest prior art.

10. Inventive step - D9 as the closest prior art

10.1 As indicated in the Board's communication (point 11.1), appellant 2 considered that the line of argumentation regarding lack of inventive step in view of D14 was very similar to the one to be applied when example 10 of D9 was taken as an alternative starting point (statement of grounds of appeal: point 7.44). The Board agrees with that view, in particular considering that:

- In view of the above finding regarding novelty of claim 1 of the main request over example 10 of D9 (section 6.3 above), the subject-matter of claim 1 of the main request differs from the disclosure of example 10 of D9 in view of the requirement regarding the XS content;

- It can be inferred from Table 3 of the patent in suit that the problem solved over example 10 of D9 can be formulated in the same manner as the one indicated above in respect of D14 (for similar reasons);

- Considering that, as compared to D14, no different or additional arguments were put forward by the appellants regarding the obviousness of the solution, the same conclusion is bound to have to be reached in this respect.

10.2 No further arguments in that respect were put forward by the appellants in writing.

10.3 During the oral proceedings before the Board, the sole additional argument put forward by appellant 2 was that the skilled person would have been motivated to lower the XS content of the copolymer prepared in example 10 of D9 in view of the indication on page 2, lines 12-15 of D9 that low XS contents were desirable in the present technical field.

However, as already indicated above in respect of D14 (section 9.4.2 above), this argument does not address the relevant question regarding why the skilled person would have been motivated to do so with the aim to solve the problem posed. In particular, the respondent's view that D9 did not disclose any evidence of an effect in terms of difference between Tm and SIT (rejoinder: page 9, penultimate paragraph) was not disputed. In these circumstances, the considerations of appellant 2 are rejected for the same reasons as the ones indicated in above section 9.4.2.

10.4 For these reasons, there is no cause for the Board to deviate from its preliminary view that the same conclusion regarding inventive step has to be reached when taking example 10 of D9 as the closest prior art than the one drawn starting from example 1 of D14.

10.5 In the light of the conclusion reached in section 9 above, this means that the arguments of the appellants do not justify that the Board overturns the decision of the opposition division that the subject-matter of claim 1 of the main request involves an inventive step when example 10 of D9 is taken as the closest prior art.

11. Since none of the appellants' objections are successful, the appeals are to be dismissed.

Order

For these reasons it is decided that:

The appeals are dismissed.

The Registrar: The Chairman:

Beschwerdekammern des Europäischen Patentamts
Boards of Appeal of the European Patent Office
Chambres de recours de l'Office européen des brevets

D. Hampe D. Marquis

Decision electronically authenticated